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ABSTRACT

Black and white students attending integrated, non-integrated, and magnet schools in Saint Louis, Missouri, were subjected to the California Achievement Tests in 1980-81, the first year of a system-wide mandatory desegregation plan in the district. Results are presented in this report in the form of statistical tables and textual analyses. Findings indicate that: (1) in both integrated and magnet schools, white students had higher posttest averages than black students, although overall pretest to posttest gains were similar; (2) blacks in non-integrated elementary and middle schools had slightly higher gains than blacks in integrated elementary and middle schools; (3) gain scores of blacks in non-integrated and in integrated secondary schools were similar; (4) blacks in magnet schools had higher pretest and posttest scores than blacks in non-integrated and integrated schools, but mean gains of magnet and non-magnet students were similar; and (5) whites in magnet schools had higher test averages than whites in integrated schools, but gain scores were about the same. It is suggested that the first year of desegregation in Saint Louis public schools seems to have had no differential effects on students' achievement, although the results cannot be considered conclusive. (Author/MJL)

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AN ANALYSIS OF THE ACHIEVEMENT OF BLACK AND WHITE STUDENTS IN VARIOUS SCHOOL SETTINGS 1980-1981

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INTRODUCTION

This analysis is based on a sampling of group data for major components of the California Achievement Test, 1980 - 1981. Included are results at grades 2, 4, 6, 8, 10, and 12 that consist of pretest and posttest means and mean gains for the Total Reading, Total Language, Total Math and Total Battery * composites of the California Achievement Tests. Three types of comparisons are made: (1) achievement of black and white students in regular integrated schools and magnet schools; (2) achievement of black students in regular integrated, regular non-integrated, and magnet schools; and (3) achievement of white students in regular integrated and magnet schools. There are no white non-integrated schools and the total number of whites in black non-integrated schools is too small to be of interest.

All results are expressed in terms of the Normal Curve Equivalent Scale (NCE). The NCE scale ranges from 1 to 99 with a midpoint of 50, the mean of the national norm group. The NCE scale differs from the percentile scale in that the NCE scale is an equal interval scale -- meaning that the interval between any two consecutive points on the scale is the same as that between any other two consecutive points. This is not true for the percentile scale where intervals between scores near the middle of the distribution are much smaller than intervals at the extremes of the scale. These differences in NCE and percentile distributions are illustrated by Figure 1. Because NCE scores are of equal intervals, they offer the advantage of allowing us to compute the mean (average) score for a group, whereas this is not a legitimate procedure with the unequal interval percentile scores.

Results are reported in terms of pretest means, posttest means, and mean differences. Mean differences (or the more frequently used term "mean gains") describe the differences between the pretest and posttest means. A mean change

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* The Total Battery is a composite score based on the results of the Reading, Language, Mathematics, and Spelling tests.

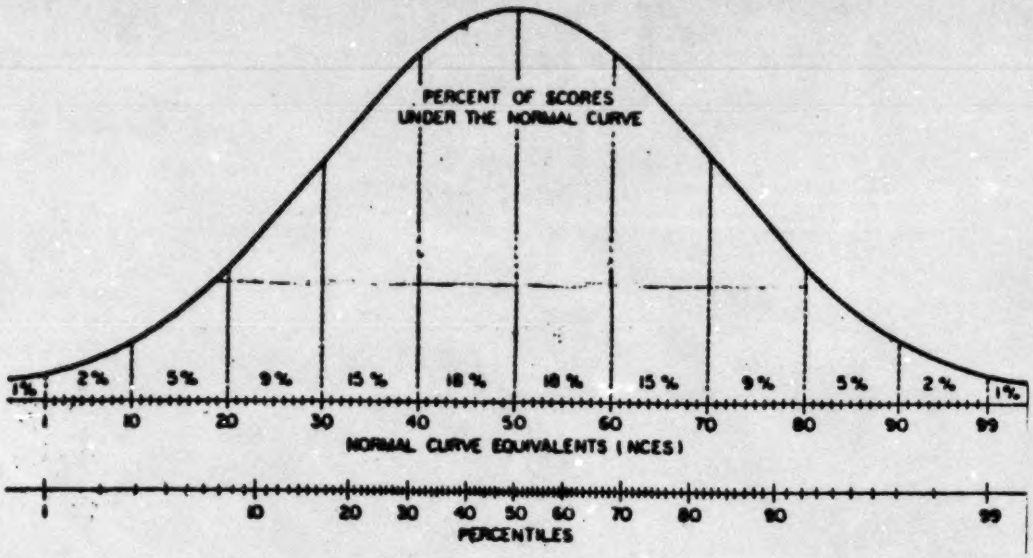

Figure 1. Comparative distributions for NCE and percentile scores

gain or loss (a "negative gain"), indicates change in relative standing against the norm group. Thus, if a group mean was 48.0 NCEs on the pretest, this group would be considered on the average slightly below the national norm. But if the posttest mean for this same group was 52.0 NCEs, it would be considered a little above the national norm and would have achieved a mean gain of 4.0 NCEs. In this example, the group tested has increased its relative standing against the norm group from pretest to posttest. In general, it is assumed that under normal learning conditions pre and post NCE averages will be about the same. That is, students will make about the same amount of progress as the norming samples from fall to spring.

An additional point to note is that 1980-81 test results cannot be directly compared to previous years' results since the school system was changed from the Iowa Tests of Basic Skills (ITBS) to the California Achievement Tests (CAT).

The results presented in this report will be of two types: Part A - Results by grade level for all groups, and Part B - Results across grade levels for specific comparisons of interest.

RESULTS: PART A

The set of tables on pages 4-6 contain results for all groups by grade level. Opposite each group is a set of four statistics placed vertically in each column: (1) n - number of students with both pretest and posttest scores on the composite test listed in the column heading, (2) Pre - the group's pretest mean, (3) Post - the group's posttest mean, and (4) Gain - the score obtained by subtracting the pretest mean from the posttest mean.

Illustration: Refer to the table showing results for Grade 2 under the column headed "Total Language." The numbers of black and white students with both pretest and posttest scores for Total Language are 677 and 668, respectively. The pretest mean for black students is 37.7 NCEs; the corresponding pretest mean for white students is 44.5 NCEs. The posttest means for each group are: 42.4 NCEs for black students and 51.6 NCEs for white students. Mean gains for this group of students are: 4.5 NCEs for black students and 7.1 NCEs for white students.

Further review of these results is left to the reader as a basis for interpreting and supplementing the observations and conclusions presented by the evaluators in Part B of the Results section. It is noted that all comparisons in Part B are derived from the basic results shown in the following tables.

Table A-1

Comparative results on CAT Composite Tests for 2nd and 4th grade black and White Students in Regular Integrated, Regular Non-Integrated, and Magnet Schools.

Grade 2		TOTAL READING		TOTAL LANGUAGE		TOTAL MATH		TOTAL BATTERY	
		Black	White	Black	White	Black	White	Black	White
	(n)	(650)	(655)	(677)	(668)	(691)	(679)	(609)	(633)
Regular Integrated	Pre	35.5	42.5	37.7	44.5	36.5	42.4	34.9	41.6
	Post	41.9	48.5	42.2	51.6	44.2	50.7	42.4	49.7
	Gain	6.4	6.0	4.5	7.1	7.7	8.3	7.5	8.1
	(n)	(2191)		(2273)		(2287)		(2032)	
Regular Non-Integrated	Pre	36.0		38.4		38.4		36.0	
	Post	42.6		45.3		46.9		44.2	
	Gain	6.6		6.9		8.5		8.2	
	(n)	(164)	(100)	(172)	(107)	(176)	(115)	(159)	(94)
Magnet	Pre	37.2	42.0	37.0	42.1	36.4	43.3	34.6	43.0
	Post	43.1	49.1	43.9	48.9	45.5	52.0	43.4	50.5
	Gain	5.9	7.1	6.9	6.8	9.1	8.7	8.8	7.5

Grade 4		TOTAL READING		TOTAL LANGUAGE		TOTAL MATH		TOTAL BATTERY	
		Black	White	Black	White	Black	White	Black	White
	(n)	(642)	(617)	(646)	(612)	(637)	(600)	(628)	(594)
Regular Integrated	Pre	34.6	44.7	37.9	45.7	38.4	44.8	36.4	44.7
	Post	41.2	49.7	43.8	52.8	44.8	51.8	42.6	51.1
	Gain	6.6	5.0	5.9	7.1	6.4	7.0	6.2	6.4
	(n)	(2340)		(2325)		(2322)		(2237)	
Regular Non-Integrated	Pre	35.2		37.7		38.6		36.6	
	Post	41.6		45.5		46.2		43.7	
	Gain	6.4		7.8		7.6		7.1	
	(n)	(218)	(159)	(218)	(159)	(212)	(157)	(212)	(155)
Magnet	Pre	48.1	53.5	50.6	53.5	50.2	50.7	49.8	53.0
	Post	52.7	59.0	55.0	60.0	55.5	57.2	54.8	59.1
	Gain	4.6	5.5	4.4	6.5	5.3	6.5	5.0	6.1

Table A-2

Comparative results on CAT Composite Tests for 6th and 8th grade Black and White Students in Regular Integrated, Regular Non-Integrated, and Magnet Schools.

Grade 6		TOTAL READING		TOTAL LANGUAGE		TOTAL MATH		TOTAL BATTERY	
		Black	White	Black	White	Black	White	Black	White
Regular Integrated	(n)	(549)	(542)	(525)	(518)	(546)	(526)	(520)	(499)
	Pre	37.7	48.9	39.1	50.5	39.6	48.1	37.9	48.7
	Post	41.4	53.0	43.4	55.4	46.0	54.3	43.3	54.2
	Gain	3.7	4.1	4.3	4.9	6.4	6.2	5.4	5.5
Regular Non-Integrated	(n)	(2127)		(2126)		(2104)		(2069)	
	Pre	37.4		39.8		39.5		38.0	
	Post	42.2		45.0		44.2		43.1	
	Gain	4.8		5.2		4.7		5.1	
Magnet	(n)	(250)	(169)	(251)	(167)	(248)	(169)	(246)	(164)
	Pre	48.6	58.3	52.0	60.9	49.7	55.4	49.8	58.6
	Post	53.8	62.9	56.5	64.5	55.5	61.1	55.3	63.3
	Gain	5.2	4.6	4.5	3.6	5.8	5.7	5.5	4.7

Grade 8		TOTAL READING		TOTAL LANGUAGE		TOTAL MATH		TOTAL BATTERY	
		Black	White	Black	White	Black	White	Black	White
Regular Integrated	(n)	(588)	(551)	(561)	(520)	(580)	(546)	(543)	(497)
	Pre	39.6	50.7	42.4	52.0	41.7	48.1	41.0	49.7
	Post	43.3	54.1	46.2	56.3	48.0	54.9	45.8	55.2
	Gain	3.7	3.4	3.8	4.3	6.3	6.8	4.8	5.5
Regular Non-Integrated	(n)	(1825)		(1818)		(1802)		(1769)	
	Pre	40.5		43.9		42.5		41.7	
	Post	45.2		47.6		48.3		46.9	
	Gain	4.7		3.7		5.8		5.2	
Magnet	(n)	(304)	(184)	(306)	(184)	(305)	(184)	(301)	(183)
	Pre	49.6	64.7	51.3	63.0	48.3	59.5	49.3	62.6
	Post	54.6	68.0	55.9	65.8	53.9	64.9	55.1	67.1
	Gain	5.0	3.3	4.6	2.8	5.6	5.4	5.8	4.5

Comparative results on CAT Composite Tests for 10th and 12th grade Black and White Students in Regular Integrated, Regular Non-Integrated, and Magnet Schools.

Grade 10		TOTAL READING		TOTAL LANGUAGE		TOTAL MATH		TOTAL BATTERY	
		Black	White	Black	White	Black	White	Black	White
	(n)	(501)	(372)	(502)	(370)	(502)	(368)	(497)	(367)
Regular Integrated	Pre	39.6	50.4	41.4	52.7	38.6	49.5	39.0	50.0
	Post	41.6	52.5	43.6	54.1	42.1	52.7	42.2	53.0
	Gain	2.0	2.1	2.2	1.4	3.5	3.2	3.2	3.0
	(n)	(1416)		(1418)		(1410)		(1391)	
Regular Non-Integrated	Pre	34.7		37.6		35.7		35.0	
	Post	36.5		39.2		38.3		37.4	
	Gain	1.8		1.6		2.6		2.4	
	(n)	(181)	(111)	(182)	(112)	(181)	(111)	(179)	(110)
Magnet	Pre	45.0	56.7	48.7	58.4	43.8	50.7	45.6	54.4
	Post	46.9	59.3	51.1	59.0	46.3	53.0	48.0	56.5
	Gain	1.9	2.6	2.4	0.6	2.5	2.3	2.4	2.1

Grade 12		TOTAL READING		TOTAL LANGUAGE		TOTAL MATH		TOTAL BATTERY	
		Black	White	Black	White	Black	White	Black	White
	(n)	(240)	(297)	(241)	(299)	(237)	(286)	(235)	(285)
Regular Integrated	Pre	37.7	53.6	39.3	55.9	41.5	53.0	38.8	53.8
	Post	40.6	53.9	40.8	56.0	43.1	54.9	41.0	54.8
	Gain	2.9	0.3	1.5	0.1	1.6	1.9	2.2	1.0
	(n)	(718)		(723)		(690)		(679)	
Regular Non-Integrated	Pre	33.0		36.0		34.9		33.5	
	Post	35.9		37.9		38.3		36.7	
	Gain	2.9		1.9		3.4		3.2	
	(n)	(129)	(32)	(131)	(34)	(132)	(32)	(128)	(30)
Magnet	Pre	42.9	64.1	45.2	56.3	41.1	54.9	42.4	58.0
	Post	45.8	64.7	44.4	59.0	42.5	58.3	43.6	61.2
	Gain	2.9	0.6	-0.8	2.7	1.4	3.4	1.2	3.2

RESULTS: PART B

Based on the overall results shown in Part A, the following comparisons were made and conclusions subsequently drawn.

The Comparative Achievement of Black and White Students

1. White students in both integrated and magnet schools had higher posttest averages than the respective black students in those schools. The greatest differences in posttest averages tended to be in the Total Reading and Total Language Composites, while smaller differences occurred for the Total Math scores. By contrast, overall pre-to-post gains for black and white students were about the same.

The above statement is based on results across grade levels comparing student achievement by race in both integrated and magnet schools. To simplify these comparisons across grade levels, the following tables, B-1a and B-1b, contain only posttest mean and mean gain differences between black and white students on the four composite test scores. For example, at Grade 2 the posttest mean for white students on the Reading Test was 6.6 NCE points higher than the posttest mean for black students. However, the average gain for white students from pre to posttesting was .4 NCEs lower than the gain for black students. To further illustrate these comparisons, it can be seen that for the Total Test Battery at Grade 2, white students in integrated schools averaged 7.3 NCEs higher on the posttest than black students, but the average gain for white students was only slightly higher (.4) than that for black students.

Table B-1a

COMPARISON OF ACHIEVEMENT FOR BLACK AND WHITE STUDENTS IN REGULAR INTEGRATED SCHOOLS

REGULAR INTEGRATED SCHOOLS

	Grade 2	Grade 4	Grade 6	Grade 8	Grade 10	Grade 12
Reading						
Posttest (W - B)	6.6	8.5	11.6	10.8	10.9	13.3
Gain (W - B)	- .4	-1.6	.4	-.3	.1	-2.6
Language						
Posttest (W - B)	9.4	9.0	12.0	10.1	10.5	15.2
Gain (W - B)	2.6	1.2	.6	.5	-.8	-1.4
Math						
Posttest (W - B)	6.5	7.0	8.3	6.9	10.6	11.8
Gain (W - B)	.6	.6	-.2	.5	-.3	.3
Total Battery						
Posttest (W - B)	7.3	8.5	10.9	9.4	10.8	13.8
Gain (W - B)	.6	.2	.1	.7	-.2	-1.2

Note: All posttest and gain differences were obtained by subtracting the means of black students from those of white students.

Table B-1b

COMPARISON OF ACHIEVEMENT FOR BLACK AND WHITE STUDENTS IN MAGNET SCHOOLS

MAGNET SCHOOLS

	Grade 2	Grade 4	Grade 6	Grade 8	Grade 10	Grade 12
Reading						
Posttest (W - B)	6.0	6.3	9.1	13.4	12.4	18.9
Gain (W - B)	1.2	.9	-.6	-1.7	.7	-2.3
Language						
Posttest (W - B)	5.0	5.0	8.0	9.9	7.9	14.6
Gain	- .1	2.1	-.9	-1.8	-1.8	3.5
Math						
Posttest (W - B)	6.5	1.7	5.6	11.0	6.7	15.8
Gain (W - B)	-.4	1.2	-.1	-.2	-.2	2.0
Total Battery						
Posttest (W - B)	7.1	4.3	8.0	12.0	8.5	17.6
Gain (W - B)	-1.3	1.1	-.8	-1.3	-.3	2.0

Note: All posttest and gain differences were obtained by subtracting the means of black students from those of white students.

By looking at Total Battery averages across grades for black and white students in integrated schools, it becomes apparent that white students consistently scored higher on the posttest than black students, but the average gain scores from pretest to posttest were generally very close. Thus, while white students were higher than black students on both pretests and posttests, the relative gains with regard to the norms showed no overall difference by race.

It can also be noted from Tables B-1a and B-1b that the average posttest differences between black and white students in integrated schools was generally greater for Reading and Language than for Mathematics.

One other finding evident from these data is that across all composite tests the greatest differences between posttest means for black and white students occurred at the 12th grade.

With regard to the comparative results for black and white students in magnet schools, nearly every general observation noted for the integrated schools is also true of the magnet schools' results. That is, white students had higher posttest means, but gain scores were not consistently higher for either racial group. Posttest differences in Reading and Language were greater than for Mathematics, and the greatest posttest differences occurred at 12th grade; posttest differences favoring white students in all instances.

Achievement of Black Students in Regular Integrated, Regular Non-Integrated, and Magnet Schools

2. Black students in non-integrated elementary and middle schools had both pre-and posttest averages very similar to those for black students in integrated elementary and middle schools. Thus, gain scores were generally close, but showed a very slight difference favoring blacks in non-integrated schools.

3. *Black students in secondary non-integrated schools typically started with considerably lower prescores on all tests than did black students in integrated secondary schools. However, gain scores were generally comparable for both groups.*

4. *Black students in magnet schools had clearly higher pretest and posttest means than black students in both integrated and non-integrated schools. At 8th grade and above these differences were relatively greater in Reading and Language than in Math. Yet, the mean gains recorded by the magnet and non-magnet groups were approximately the same.*

The above conclusions are derived from comparisons shown in Tables B-2a and B-2b which contains results for black students in: (a) regular integrated and regular non-integrated schools, and (b) magnet and regular non-integrated schools. Though comparisons between black students in magnet and regular integrated schools are not presented in this table, results for the two groups can be derived from the two sets of results which are shown.

*It should be noted in reviewing the results in Tables B-2a and B-2b that even though pretest differences aren't shown, the data which are shown can be used to compute pretest differences. For example, the Grade 2 Language scores show that the average posttest score for black non-integrated students was 3.1 NCEs higher than the black integrated mean. Also, the mean gain for the black non-integrated group was 2.4 NCEs higher. From this we would know that 2.4 NCEs of the 3.1 NCEs posttest difference was accounted for by the difference in mean gains for the two groups. Thus, the pretest difference between the two groups must have been 0.7 NCEs (3.1 minus 2.4), in favor of the black non-integrated group.

Table B-2a

COMPARISON OF BLACK STUDENT ACHIEVEMENT IN
INTEGRATED AND NON-INTEGRATED SCHOOLS

	Grade 2	Grade 4	Grade 6	Grade 8	Grade 10	Grade 12
Reading						
Posttest (I - NI)	-.7	-.4	-.8	-1.9	5.1	4.7
Gain (I - NI)	-.2	.2	-1.1	-1.0	.2	0.0
Language						
Posttest (I - NI)	-3.1	-1.7	-1.6	-1.4	4.4	2.9
Gain (I - NI)	-2.4	-1.9	-.9	.1	.6	-.4
Math						
Posttest (I - NI)	-2.7	-1.4	1.8	-.3	3.8	4.8
Gain (I - NI)	-.8	-1.2	1.7	.5	.9	-1.8
Total Battery						
Posttest (I - NI)	-1.8	-1.1	.2	-1.1	4.8	4.3
Gain (I - NI)	-.7	-.9	.3	-.4	.8	-1.0

Note: All posttest and gain differences were obtained by subtracting the means of black students enrolled in non-integrated schools from those enrolled in integrated schools.

Table B-2b

COMPARISON OF BLACK STUDENT ACHIEVEMENT IN
NON-INTEGRATED AND MAGNET SCHOOLS

	Grade 2	Grade 4	Grade 6	Grade 8	Grade 10	Grade 12
Reading						
Posttest (M - NI)	.5	11.1	11.6	9.4	10.4	9.9
Gain (M - NI)	-.7	-1.8	.4	.3	.1	0.0
Language						
Posttest (M - NI)	-1.4	9.5	11.5	8.3	11.9	6.5
Gain (M - NI)	0.0	-3.4	-.7	.9	.8	-2.7
Math						
Posttest (M - NI)	-1.4	9.3	11.3	5.6	8.0	4.2
Gain (M - NI)	.6	-2.3	1.1	-.2	-.1	-2.0
Total Battery						
Posttest (M - NI)	-.8	11.1	12.2	8.2	10.6	6.9
Gain (M - NI)	.6	-2.1	.4	.6	0.0	-2.0

Note: All posttest and gain differences were obtained by subtracting the means of black students enrolled in non-integrated schools from those enrolled in magnet schools.

Using the above type of computation, it becomes evident that black students attending integrated secondary schools not only had substantially higher post-test scores in grades 10 and 12, but they also had comparably higher pretest scores. Thus, black students attending regular integrated schools typically had higher achievement at the outset and they generally maintained, but did not increase, that higher level on the posttests.

Similarly, black students attending magnet schools, except at 2nd grade, show much higher posttest averages than black students in regular non-integrated schools. Furthermore, it is evident from the small differences in gain scores for the two groups that the magnet school students started with much higher achievement scores on the pretest.

Though not specifically shown in Tables B-2a and B-2b it is evident from these data that black students in magnet schools also had higher achievement levels on both the pretest and posttest than did black students in regular integrated schools, including the secondary students.

The Achievement of White Students in Regular Integrated and Magnet Schools

5. White students in elementary magnet schools (grades 2-8) generally had substantially higher pre-and posttest averages than white students in corresponding grades of integrated schools; these differences were somewhat more pronounced on the Reading and Language Composites than for Math. Gain scores for magnet students, however, were about the same or slightly lower than those for non-magnet students depending on the grade.

6. White students in secondary magnet schools had higher pretest and posttest averages than white students in integrated high schools, but the magnitude of these differences was less pronounced than at the elementary and middle grade levels. Also, gain scores of the two groups were very similar.

Table B-3 provides the comparisons on which the above conclusions were based. As shown in this table, posttest differences were typically the greatest below the secondary level except for Grade 2 where the magnet and non-magnet students had comparable achievement on both the pretest and posttest.

Table B-3

COMPARISON IN WHITE STUDENT ACHIEVEMENT IN

INTEGRATED AND MAGNET SCHOOLS

	Grade 2	Grade 4	Grade 6	Grade 8	Grade 10	Grade 12
Reading						
Posttest (M - I)	.6	9.3	9.9	13.9	6.8	10.8
Gain (M - I)	1.1	.5	.5	-.1	.5	.3
Language						
Posttest (M - I)	-2.7	7.2	9.1	9.5	4.9	3.0
Gain (M - I)	- .3	-.6	-1.3	-1.5	-.8	2.6
Math						
Posttest (M - I)	1.3	5.4	6.8	10.0	.3	3.4
Gain (M - I)	.4	-.5	-.5	-1.4	-.9	1.5
Total Battery						
Posttest (M - I)	.8	8.0	9.1	11.9	3.5	6.4
Gain (M - I)	-.6	-.3	-.8	-1.0	-.9	2.2

Note: All posttest and gain differences were obtained by subtracting the means of white students enrolled in integrated schools from those enrolled in magnet schools.

GENERAL DISCUSSION

One of the questions which seems almost universal with regard to the impact of desegregation is the effect it will have on students' achievement. Some hypothesize that white students will drop in achievement, while others cite the probable gain that blacks will make. In reality available evidence suggests that, at least initially, desegregation will likely have little impact on the achievement of students of either race.

Based on the results presented in this report, it would seem that the first year of desegregation has had no differential effects on students' achievement, but it is difficult to draw firm conclusions on the basis of these data alone. In general, the results showed that there were differences among students by race and there were differences in achievement by students of the same race who attended magnet and non-magnet schools. However, while pre-and posttest means differed for groups, NCE gain scores were usually about the same indicating that students either maintained their relative levels or made comparable gains with regard to the norming populations.

There was no indication that white students achieved less than expected nor that black students achieved more than anticipated as a direct result of desegregation. However, it must be acknowledged when interpreting these results that the available data permit only limited analysis. A major limitation in analyzing 1980-81 CAT results is that this was the first year for that test in the SLPSs and historical comparisons are not directly possible.* Thus, while this year's results indicate no differential impact on students by group, the absence of historical trends for those same groups of students makes it necessary to qualify interpretations of the current data.

It should be noted in reviewing comparative achievement data such as these, that the impact of the desegregation effort is more likely to have a longitudinal rather than immediate effect regarding students' achievement. It should also be emphasized that the improvement of students' achievement, as measured by standardized tests, is an important goal, but certainly not the only nor necessarily the highest priority of the desegregation effort.

*The Division of Evaluation is currently conducting an equating study which is intended to provide comparative data between the CAT and the previously used ITBS (Iowa Tests of Basic Skills).